

## SEQUENCE LISTING

<110> Nezu, Jun-Ichi  
Oku, Asuka

<120> TRANSPORTER GENES

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<140> 09/521,195

<141> 2000-03-07

<150> JP 10/156660

<151> 1998-05-20

<150> JP 9/260972

<151> 1997-09-08

<150> PCT/JP98/04009

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<212> PRT

<213> Homo sapiens

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Trp	Glu	Met	Phe	Thr	Val	Leu	Phe	Val	Ile	Val	Gly	Met	Gly	Gln	Ile
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 Leu Trp Trp Phe Ile Pro Glu Ser Pro Arg Trp Leu Ile Ser Gln Arg  
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 Arg Phe Arg Glu Ala Glu Asp Ile Ile Gln Lys Ala Ala Lys Met Asn  
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 Pro Leu Lys Gln Gln Lys Ala Phe Ile Leu Asp Leu Phe Arg Thr Arg  
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 Ala Glu Leu Tyr Pro Thr Leu Val Arg Asn Met Ala Val Gly Val Thr  
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Ser Ala Ser Ile Ile Pro Asn Gly Phe Asn Gly Met Ser Val Val Phe	
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ctg gcg ggg acc ccg gag cac cgc tgt cga gtg ccg gac gcc gcg aac	317
Leu Ala Gly Thr Pro Glu His Arg Cys Arg Val Pro Asp Ala Ala Asn	
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ctg agc agc gcc tgg cgc aac aac agt gtc ccg ctg cgg ctg cgg gac	365
Leu Ser Ser Ala Trp Arg Asn Asn Ser Val Pro Leu Arg Leu Arg Asp	
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ggc cgc gag gtg ccc cac agc tgc agc cgc tac cgg ctc gcc acc atc	413
Gly Arg Glu Val Pro His Ser Cys Ser Arg Tyr Arg Leu Ala Thr Ile	
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gcc aac ttc tgc gcg ctc ggg ctg gag ccg ggg cgc gac gtg gac ctg	461
Ala Asn Phe Ser Ala Leu Gly Leu Glu Pro Gly Arg Asp Val Asp Leu	
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Gly Gln Leu Glu Gln Glu Ser Cys Leu Asp Gly Trp Glu Phe Ser Gln	
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gac gtc tac ctg tcc acc gtc gtg acc gag tgg aat ctg gtg tgt gag	557
Asp Val Tyr Leu Ser Thr Val Val Thr Glu Trp Asn Leu Val Cys Glu	
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Asp Asn Trp Lys Val Pro Leu Thr Thr Ser Leu Phe Phe Val Gly Val	
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Leu Leu Gly Ser Phe Val Ser Gly Gln Leu Ser Asp Arg Phe Gly Arg	
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Lys Asn Val Leu Phe Ala Thr Met Ala Val Gln Thr Gly Phe Ser Phe	
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Leu Gln Ile Phe Ser Ile Ser Trp Glu Met Phe Thr Val Leu Phe Val	
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Ile Val Gly Met Gly Gln Ile Ser Asn Tyr Val Val Ala Phe Ile Leu	
205 210 215	
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Gly Thr Glu Ile Leu Gly Lys Ser Val Arg Ile Ile Phe Ser Thr Leu	
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Gly Val Cys Thr Phe Phe Ala Val Gly Tyr Met Leu Leu Pro Leu Phe	
235 240 245	
gct tac ttc atc aga gac tgg cgg atg ctg ctg ctg gcg ctg acg gtg	941
Ala Tyr Phe Ile Arg Asp Trp Arg Met Leu Leu Ala Leu Thr Val	
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Pro Gly Val Leu Cys Val Pro Leu Trp Trp Phe Ile Pro Glu Ser Pro	
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Arg Trp Leu Ile Ser Gln Arg Arg Phe Arg Glu Ala Glu Asp Ile Ile	
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Gln Lys Ala Ala Lys Met Asn Asn Thr Ala Val Pro Ala Val Ile Phe	
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365 370 375	
gcc ttg att gaa att cca gct tac att aca gcc tgg ctg cta ttg cga	1325
Ala Leu Ile Glu Ile Pro Ala Tyr Ile Thr Ala Trp Leu Leu Leu Arg	
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Thr Leu Pro Arg Arg Tyr Ile Ile Ala Ala Val Leu Phe Trp Gly Gly	
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Gly Val Leu Leu Phe Ile Gln Leu Val Pro Val Asp Tyr Tyr Phe Leu	
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Ser Ile Gly Leu Val Met Leu Gly Lys Phe Gly Ile Thr Ser Ala Phe	
430 435 440	
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Ser Met Leu Tyr Val Phe Thr Ala Glu Leu Tyr Pro Thr Leu Val Arg	

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Asn Met Ala Val Gly Val Thr Ser Thr Ala Ser Arg Val Gly Ser Ile			
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att gcc ccc tac ttt gtt tac ctc ggt gct tac aac aga atg ctg ccc			1613
Ile Ala Pro Tyr Phe Val Tyr Leu Gly Ala Tyr Asn Arg Met Leu Pro			
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tac atc gtc atg ggt agt ctg act gtc ctg att gga atc ttc acc ctt			1661
Tyr Ile Val Met Gly Ser Leu Thr Val Leu Ile Gly Ile Phe Thr Leu			
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Phe Phe Pro Glu Ser Leu Gly Met Thr Leu Pro Glu Thr Leu Glu Gln			
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Met Gln Lys Val Lys Trp Phe Arg Ser Gly Lys Lys Thr Arg Asp Ser			
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Met Glu Thr Glu Glu Asn Pro Lys Val Leu Ile Thr Ala Phe			
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aattcgttgt tcccactgaa atggactgac tgtaacgatt gacaccaaaa tgaaccttgc			1919
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Asn Gly Phe Thr Gly Leu Ser Ser Val Phe Leu Ile Ala Thr Pro Glu			
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His Arg Cys Arg Val Pro Asp Ala Ala Asn Leu Ser Ser Ala Trp Arg			
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Asn His Thr Val Pro Leu Arg Leu Arg Asp Gly Arg Glu Val Pro His			

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Ser Cys Arg Arg Tyr Arg Leu Ala Thr Ile Ala Asn Phe Ser Ala Leu 80 85 90 95		
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Ser Cys Leu Asp Gly Trp Glu Phe Ser Gln Asp Val Tyr Leu Ser Thr 115 120 125		
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Ser Gly Gln Leu Ser Asp Arg Phe Gly Arg Lys Asn Val Leu Phe Val 160 165 170 175		
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Asn Phe Glu Met Phe Val Val Leu Phe Val Leu Val Gly Met Gly Gln 195 200 205		
Ile Ser Asn Tyr Val Ala Ala Phe Val Leu Gly Thr Glu Ile Leu Gly 210 215 220		
Lys Ser Val Arg Ile Ile Phe Ser Thr Leu Gly Val Cys Ile Phe Tyr 225 230 235		
Ala Phe Gly Tyr Met Val Leu Pro Leu Phe Ala Tyr Phe Ile Arg Asp 240 245 250 255		
Trp Arg Met Leu Leu Val Ala Leu Thr Met Pro Gly Val Leu Cys Val 260 265 270		
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Gly Arg Phe Glu Glu Ala Glu Val Ile Ile Arg Lys Ala Ala Lys Ala 290 295 300		
Asn Gly Ile Val Val Pro Ser Thr Ile Phe Asp Pro Ser Glu Leu Gln 305 310 315		
Asp Leu Ser Ser Lys Lys Gln Gln Ser His Asn Ile Leu Asp Leu Leu 320 325 330 335		
Arg Thr Trp Asn Ile Arg Met Val Thr Ile Met Ser Ile Met Leu Trp 340 345 350		
Met Thr Ile Ser Val Gly Tyr Phe Gly Leu Ser Leu Asp Thr Pro Asn 355 360 365		
Leu His Gly Asp Ile Phe Val Asn Cys Phe Leu Ser Ala Met Val Glu		

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Arg Tyr Ser Met Ala Thr Ala Leu Phe Leu Gly Gly Ser Val Leu Leu		
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Phe Met Gln Leu Val Pro Pro Asp Leu Tyr Tyr Leu Ala Thr Val Leu		
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Val Met Val Gly Lys Phe Gly Val Thr Ala Ala Phe Ser Met Val Tyr		
	435	440 445
Val Tyr Thr Ala Glu Leu Tyr Pro Thr Val Val Arg Asn Met Gly Val		
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Gly Val Ser Ser Thr Ala Ser Arg Leu Gly Ser Ile Leu Ser Pro Tyr		
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Phe Val Tyr Leu Gly Ala Tyr Asp Arg Phe Leu Pro Tyr Ile Leu Met		
480	485	490 495
Gly Ser Leu Thr Ile Leu Thr Ala Ile Leu Thr Leu Phe Leu Pro Glu		
	500	505 510
Ser Phe Gly Thr Pro Leu Pro Asp Thr Ile Asp Gln Met Leu Arg Val		
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Asp Gly Gln Glu Arg Pro Thr Ile Leu Lys Ser Thr Ala Phe		
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ggc atg cgg gac tac gac gag gtg acc gcc ttc ctg ggc gag tgg ggg	168
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ccc ttc cag cgc ctc atc ttc ttc ctg ctc agc gcc agc atc atc ccc	216
Pro Phe Gln Arg Leu Ile Phe Phe Leu Leu Ser Ala Ser Ile Ile Pro	
20 25 30	

aat ggc ttc acc ggc ctg tcc tcc gtg ttc ctg ata gcg acc ccg gag	264
Asn Gly Phe Thr Gly Leu Ser Ser Val Phe Leu Ile Ala Thr Pro Glu	
35 40 45	
cac cgc tgc cgg gtg ccg gac gcc gcg aac ctg agc agc gcc tgg cgc	312
His Arg Cys Arg Val Pro Asp Ala Ala Asn Leu Ser Ser Ala Trp Arg	
50 55 60	
aac cac act gtc cca ctg cgg ctg cgg gac ggc cgc gag gtg ccc cac	360
Asn His Thr Val Pro Leu Arg Leu Arg Asp Gly Arg Glu Val Pro His	
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Ser Cys Arg Arg Tyr Arg Leu Ala Thr Ile Ala Asn Phe Ser Ala Leu	
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Gly Leu Glu Pro Gly Arg Asp Val Asp Leu Gly Gln Leu Glu Gln Glu	
100 105 110	
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Ser Cys Leu Asp Gly Trp Glu Phe Ser Gln Asp Val Tyr Leu Ser Thr	
115 120 125	
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Ile Val Thr Glu Trp Asn Leu Val Cys Glu Asp Asp Trp Lys Ala Pro	
130 135 140	
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Leu Thr Ile Ser Leu Phe Phe Val Gly Val Leu Leu Gly Ser Phe Ile	
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Ser Gly Gln Leu Ser Asp Arg Phe Gly Arg Lys Asn Val Leu Phe Val	
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acc atg ggc atg cag aca ggc ttc agc ttc ctg cag atc ttc tcg aag	696
Thr Met Gly Met Gln Thr Gly Phe Ser Phe Leu Gln Ile Phe Ser Lys	
180 185 190	
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Asn Phe Glu Met Phe Val Val Leu Phe Val Leu Val Gly Met Gly Gln	
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Ile Ser Asn Tyr Val Ala Ala Phe Val Leu Gly Thr Glu Ile Leu Gly	
210 215 220	
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Lys Ser Val Arg Ile Ile Phe Ser Thr Leu Gly Val Cys Ile Phe Tyr	
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Ala Phe Gly Tyr Met Val Leu Pro Leu Phe Ala Tyr Phe Ile Arg Asp	
240 245 250 255	
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Gly	Arg	Phe	Glu	Glu	Ala	Glu	Val	Ile	Ile	Arg	Lys	Ala	Ala	Lys	Ala	
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aat	ggg	att	gtt	gtg	cct	tcc	act	atc	ttt	gac	ccg	agt	gag	tta	caa	1080
Asn	Gly	Ile	Val	Val	Pro	Ser	Thr	Ile	Phe	Asp	Pro	Ser	Glu	Leu	Gln	
	305					310				315						
gac	cta	agt	tcc	aag	aag	cag	cag	tcc	cac	aac	att	ctg	gat	ctg	ctt	1128
Asp	Leu	Ser	Ser	Lys	Lys	Gln	Gln	Ser	His	Asn	Ile	Leu	Asp	Leu	Leu	
	320			325					330					335		
cga	acc	tgg	aat	atc	cgg	atg	gtc	acc	atc	atg	tcc	ata	atg	ctg	tgg	1176
Arg	Thr	Trp	Asn	Ile	Arg	Met	Val	Thr	Ile	Met	Ser	Ile	Met	Leu	Trp	
			340					345					350			
atg	acc	ata	tca	gtg	ggc	tat	ttt	ggg	ctt	tcg	ctt	gat	act	cct	aac	1224
Met	Thr	Ile	Ser	Val	Gly	Tyr	Phe	Gly	Leu	Ser	Leu	Asp	Thr	Pro	Asn	
		355					360					365				
ttg	cat	ggg	gac	atc	ttt	gtg	aac	tgc	ttc	ctt	tca	gcg	atg	gtt	gaa	1272
Leu	His	Gly	Asp	Ile	Phe	Val	Asn	Cys	Phe	Leu	Ser	Ala	Met	Val	Glu	
	370					375					380					
gtc	cca	gca	tat	gtg	ttg	gcc	tgg	ctg	ctg	ctg	caa	tat	ttg	ccc	cgg	1320
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Arg	Tyr	Ser	Met	Ala	Thr	Ala	Leu	Phe	Leu	Gly	Gly	Ser	Val	Leu	Leu	
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Phe	Met	Gln	Leu	Val	Pro	Pro	Asp	Leu	Tyr	Tyr	Leu	Ala	Thr	Val	Leu	
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Val	Met	Val	Gly	Lys	Phe	Gly	Val	Thr	Ala	Ala	Phe	Ser	Met	Val	Tyr	
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Val	Tyr	Thr	Ala	Glu	Leu	Tyr	Pro	Thr	Val	Val	Arg	Asn	Met	Gly	Val	
	450					455					460					
gga	gtc	agc	tcc	aca	gca	tcc	cgc	ctg	ggc	agc	atc	ctg	tct	ccc	tac	1560
Gly	Val	Ser	Ser	Thr	Ala	Ser	Arg	Leu	Gly	Ser	Ile	Leu	Ser	Pro	Tyr	
	465				470					475						
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Phe	Val	Tyr	Leu	Gly	Ala	Tyr	Asp	Arg	Phe	Leu	Pro	Tyr	Ile	Leu	Met	

480	485	490	495	
gga agt ctg acc atc ctg aca gcc atc ctc acc ttg ttt ctc cca gag				1656
Gly Ser Leu Thr Ile Leu Thr Ala Ile Leu Thr Leu Phe Leu Pro Glu				
	500	505	510	
agc ttc ggt acc cca ctc cca gac acc att gac cag atg cta aga gtc				1704
Ser Phe Gly Thr Pro Leu Pro Asp Thr Ile Asp Gln Met Leu Arg Val				
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Lys Gly Met Lys His Arg Lys Thr Pro Ser His Thr Arg Met Leu Lys				
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gat ggt caa gaa agg ccc aca atc ctt aaa agc aca gcc ttc				1794
Asp Gly Gln Glu Arg Pro Thr Ile Leu Lys Ser Thr Ala Phe				
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<223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

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22

<210> 13

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<223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

<400> 13

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24

<210> 14

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<223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

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24

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agcatcctgt ctccctactt cggt

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<210> 22

<211> 553

&lt;212&gt; PRT

&lt;213&gt; Mus musculus

&lt;400&gt; 22

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Phe Gln Arg Leu Ile Phe Phe Leu Leu Ser Ala Ser Ile Ile Pro Asn
          20           25           30

Gly Phe Asn Gly Met Ser Val Val Phe Leu Ala Gly Thr Pro Glu His
          35           40           45

Arg Cys Leu Val Pro Asp Thr Val Asn Leu Ser Ser Ser Trp Arg Asn
          50           55           60

His Ser Ile Pro Leu Glu Thr Lys Asp Gly Arg Gln Val Pro Gln Ser
          65           70           75           80

Cys Arg Arg Tyr Arg Leu Ala Thr Ile Ala Asn Phe Ser Ala Met Gly
          85           90           95

Leu Glu Pro Gly Gln Asp Val Asp Leu Glu Gln Leu Glu Gln Glu Ser
          100          105          110

Cys Leu Asp Gly Trp Glu Tyr Asp Lys Asp Ile Phe Leu Ser Thr Ile
          115          120          125

Val Thr Glu Trp Asn Leu Val Cys Glu Asp Asp Trp Lys Thr Pro Leu
          130          135          140

Thr Thr Ser Leu Phe Phe Val Gly Val Leu Cys Gly Ser Phe Val Ser
          145          150          155          160

Gly Gln Leu Ser Asp Arg Phe Gly Arg Lys Lys Val Leu Phe Ala Thr
          165          170          175

Met Ala Val Gln Thr Gly Phe Ser Phe Val Gln Ile Phe Ser Thr Asn
          180          185          190

Trp Glu Met Phe Thr Val Leu Phe Ala Ile Val Gly Met Gly Gln Ile
          195          200          205

Ser Asn Tyr Val Val Ala Phe Ile Leu Gly Thr Glu Ile Leu Ser Lys
          210          215          220

Ser Val Arg Ile Ile Phe Ser Thr Leu Gly Val Cys Thr Phe Phe Ala
          225          230          235          240

Ile Gly Tyr Met Val Leu Pro Leu Phe Ala Tyr Phe Ile Arg Asp Trp
          245          250          255

Arg Met Leu Leu Leu Ala Leu Thr Leu Pro Gly Leu Phe Cys Val Pro
          260          265          270

Leu Trp Trp Phe Ile Pro Glu Ser Pro Arg Trp Leu Ile Ser Gln Arg
          275          280          285

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Arg Phe Ala Glu Ala Glu Gln Ile Ile Gln Lys Ala Ala Lys Met Asn  
 290 295 300  
 Ser Ile Val Ala Pro Ala Gly Ile Phe Asp Pro Leu Glu Leu Gln Glu  
 305 310 315 320  
 Leu Asn Ser Leu Lys Gln Gln Lys Val Ile Ile Leu Asp Leu Phe Arg  
 325 330 335  
 Thr Arg Asn Ile Ala Thr Ile Thr Val Met Ala Val Met Leu Trp Met  
 340 345 350  
 Leu Thr Ser Val Gly Tyr Phe Ala Leu Ser Leu Asn Val Pro Asn Leu  
 355 360 365  
 His Gly Asp Val Tyr Leu Asn Cys Phe Leu Ser Gly Leu Ile Glu Val  
 370 375 380  
 Pro Ala Tyr Phe Thr Ala Trp Leu Leu Leu Arg Thr Leu Pro Arg Arg  
 385 390 395 400  
 Tyr Ile Ile Ala Gly Val Leu Phe Trp Gly Gly Gly Val Leu Leu Leu  
 405 410 415  
 Ile Gln Val Val Pro Glu Asp Tyr Asn Phe Val Ser Ile Gly Leu Val  
 420 425 430  
 Met Leu Gly Lys Phe Gly Ile Thr Ser Ala Phe Ser Met Leu Tyr Val  
 435 440 445  
 Phe Thr Ala Glu Leu Tyr Pro Thr Leu Val Arg Asn Met Ala Val Gly  
 450 455 460  
 Ile Thr Ser Met Ala Ser Arg Val Gly Ser Ile Ile Ala Pro Tyr Phe  
 465 470 475 480  
 Val Tyr Leu Gly Ala Tyr Asn Arg Leu Leu Pro Tyr Ile Leu Met Gly  
 485 490 495  
 Ser Leu Thr Val Leu Ile Gly Ile Ile Thr Leu Phe Phe Pro Glu Ser  
 500 505 510  
 Phe Gly Val Thr Leu Pro Glu Asn Leu Glu Gln Met Gln Lys Val Arg  
 515 520 525  
 Gly Phe Arg Cys Gly Lys Lys Ser Thr Val Ser Val Asp Arg Glu Glu  
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<210> 23

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<212> DNA

<213> Mus musculus

&lt;220&gt;

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&lt;222&gt; (122)..(1780)

&lt;400&gt; 23

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tcgctgaatc ctttctctcc acccacctcc ctcacgcaag ctgaggagga gaggtggaaa 120

c atg cgg gac tac gac gag gtg atc gcc ttc ctg ggc gag tgg ggg ccc 169
  Met Arg Asp Tyr Asp Glu Val Ile Ala Phe Leu Gly Glu Trp Gly Pro
    1         5         10        15
ttc cag cgc ctc atc ttc ttt ctg ctc agc gcc agc atc atc ccc aat 217
Phe Gln Arg Leu Ile Phe Phe Leu Leu Ser Ala Ser Ile Ile Pro Asn
    20        25        30
ggc ttc aat ggt atg tca gtc gtg ttc ctg gcg ggg acc ccc gag cac 265
Gly Phe Asn Gly Met Ser Val Val Phe Leu Ala Gly Thr Pro Glu His
    35        40        45
cgt tgc ctg gtt cct gac act gtg aac ctg agc agc tcc tgg cgc aac 313
Arg Cys Leu Val Pro Asp Thr Val Asn Leu Ser Ser Ser Trp Arg Asn
    50        55        60
cac agc atc ccc ttg gag acg aag gac gga cga cag gtg cct cag agc 361
His Ser Ile Pro Leu Glu Thr Lys Asp Gly Arg Gln Val Pro Gln Ser
    65        70        75        80
tgc cgc cgc tac cga ctg gcc acc atc gcc aac ttc tct gcg atg ggg 409
Cys Arg Arg Tyr Arg Leu Ala Thr Ile Ala Asn Phe Ser Ala Met Gly
    85        90        95
ctg gag cca gga cag gac gtg gat ctg gag cag ctg gag cag gag agc 457
Leu Glu Pro Gly Gln Asp Val Asp Leu Glu Gln Leu Glu Gln Glu Ser
   100       105       110
tgc ctg gat ggc tgg gag tac gac aag gac atc ttc ctg tcc acc atc 505
Cys Leu Asp Gly Trp Glu Tyr Asp Lys Asp Ile Phe Leu Ser Thr Ile
   115       120       125
gtg aca gag tgg aat ctg gtg tgt gag gat gac tgg aag aca ccc ctc 553
Val Thr Glu Trp Asn Leu Val Cys Glu Asp Asp Trp Lys Thr Pro Leu
   130       135       140
acc acc tcc ctg ttc ttc gta ggc gtt ctc tgc ggc tcc ttc gtg tct 601
Thr Thr Ser Leu Phe Phe Val Gly Val Leu Cys Gly Ser Phe Val Ser
   145       150       155       160
ggg cag ctg tca gac agg ttt ggc agg aag aaa gtc ctc ttt gca acc 649
Gly Gln Leu Ser Asp Arg Phe Gly Arg Lys Lys Val Leu Phe Ala Thr
   165       170       175
atg gct gtg cag act gga ttc agc ttc gtg cag att ttc tca acc aac 697
Met Ala Val Gln Thr Gly Phe Ser Phe Val Gln Ile Phe Ser Thr Asn
   180       185       190
tgg gag atg ttc act gtg ttg ttt gcc att gtg ggc atg ggc cag atc 745

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Trp	Glu	Met	Phe	Thr	Val	Leu	Phe	Ala	Ile	Val	Gly	Met	Gly	Gln	Ile		
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Ser	Asn	Tyr	Val	Val	Ala	Phe	Ile	Leu	Gly	Thr	Glu	Ile	Leu	Ser	Lys		
	210					215					220						
tcg	gtt	cgc	atc	atc	ttc	tcc	aca	tta	gga	gtc	tgt	aca	ttt	ttt	gca	841	
Ser	Val	Arg	Ile	Ile	Phe	Ser	Thr	Leu	Gly	Val	Cys	Thr	Phe	Phe	Ala		
225					230					235					240		
atc	ggc	tac	atg	gtc	ctg	ccg	ctg	ttt	gca	tac	ttc	atc	aga	gac	tgg	889	
Ile	Gly	Tyr	Met	Val	Leu	Pro	Leu	Phe	Ala	Tyr	Phe	Ile	Arg	Asp	Trp		
				245					250					255			
agg	atg	ctg	ctg	ctg	gcc	ctg	aca	ctg	cct	ggc	ctg	ttc	tgt	gtt	ccc	937	
Arg	Met	Leu	Leu	Leu	Ala	Leu	Thr	Leu	Pro	Gly	Leu	Phe	Cys	Val	Pro		
			260					265					270				
ctg	tgg	tgg	ttt	att	cca	gaa	tct	ccc	cgg	tgg	ctg	ata	tcc	cag	agg	985	
Leu	Trp	Trp	Phe	Ile	Pro	Glu	Ser	Pro	Arg	Trp	Leu	Ile	Ser	Gln	Arg		
		275					280					285					
aga	ttt	gca	gag	gcc	gaa	cag	atc	atc	cag	aaa	gcc	gca	aag	atg	aac	1033	
Arg	Phe	Ala	Glu	Ala	Glu	Gln	Ile	Ile	Gln	Lys	Ala	Ala	Lys	Met	Asn		
	290					295					300						
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Ser	Ile	Val	Ala	Pro	Ala	Gly	Ile	Phe	Asp	Pro	Leu	Glu	Leu	Gln	Glu		
305					310					315					320		
cta	aac	tcc	ttg	aag	cag	cag	aaa	gtc	ata	atc	ctg	gac	ctg	ttc	agg	1129	
Leu	Asn	Ser	Leu	Lys	Gln	Gln	Lys	Val	Ile	Ile	Leu	Asp	Leu	Phe	Arg		
				325					330					335			
act	cgg	aac	att	gcc	acc	ata	acc	gtg	atg	gct	gtg	atg	ctg	tgg	atg	1177	
Thr	Arg	Asn	Ile	Ala	Thr	Ile	Thr	Val	Met	Ala	Val	Met	Leu	Trp	Met		
			340					345					350				
cta	acc	tca	gtg	ggt	tac	ttt	gct	ctg	tct	ctc	aat	gtt	cct	aat	tta	1225	
Leu	Thr	Ser	Val	Gly	Tyr	Phe	Ala	Leu	Ser	Leu	Asn	Val	Pro	Asn	Leu		
		355					360					365					
cat	gga	gat	gtc	tac	ctg	aac	tgc	ttc	ctc	tct	ggc	ctg	att	gaa	gtt	1273	
His	Gly	Asp	Val	Tyr	Leu	Asn	Cys	Phe	Leu	Ser	Gly	Leu	Ile	Glu	Val		
	370					375					380						
cca	gct	tac	ttc	aca	gcc	tgg	ctg	cta	ctg	cga	acc	ctg	cca	cgg	aga	1321	
Pro	Ala	Tyr	Phe	Thr	Ala	Trp	Leu	Leu	Leu	Arg	Thr	Leu	Pro	Arg	Arg		
385					390					395					400		
tat	att	ata	gct	ggg	gtg	cta	ttc	tgg	gga	gga	ggt	gtg	ctt	ctc	ttg	1369	
Tyr	Ile	Ile	Ala	Gly	Val	Leu	Phe	Trp	Gly	Gly	Gly	Val	Leu	Leu	Leu		
				405					410					415			
atc	caa	gtg	gta	cct	gaa	gat	tat	aac	ttt	gtg	tcc	att	gga	ctg	gtg	1417	
Ile	Gln	Val	Val	Pro	Glu	Asp	Tyr	Asn	Phe	Val	Ser	Ile	Gly	Leu	Val		

420	425	430	
atg ctg ggg aaa ttt ggg atc acc tct gcc ttc tcc atg ttg tat gtc			1465
Met Leu Gly Lys Phe Gly Ile Thr Ser Ala Phe Ser Met Leu Tyr Val			
435	440	445	
ttc act gcg gag ctc tac cca acc ctg gtc agg aac atg gct gtg ggc			1513
Phe Thr Ala Glu Leu Tyr Pro Thr Leu Val Arg Asn Met Ala Val Gly			
450	455	460	
atc acc tcc atg gcc tct cgg gtg ggc agc atc att gcc ccc tat ttc			1561
Ile Thr Ser Met Ala Ser Arg Val Gly Ser Ile Ile Ala Pro Tyr Phe			
465	470	475	480
gtt tac ctg ggc gcc tat aac aga ctc cta ccc tac atc ctc atg ggc			1609
Val Tyr Leu Gly Ala Tyr Asn Arg Leu Leu Pro Tyr Ile Leu Met Gly			
485	490	495	
agt ctg act gtc ctc att gga atc atc acg ctt ttt ttc cct gaa agt			1657
Ser Leu Thr Val Leu Ile Gly Ile Ile Thr Leu Phe Phe Pro Glu Ser			
500	505	510	
ttt gga gtg act cta cca gag aac ttg gag cag atg cag aaa gtg aga			1705
Phe Gly Val Thr Leu Pro Glu Asn Leu Glu Gln Met Gln Lys Val Arg			
515	520	525	
ggg ttc aga tgt ggg aaa aaa tca aca gtc tca gtg gac aga gaa gaa			1753
Gly Phe Arg Cys Gly Lys Lys Ser Thr Val Ser Val Asp Arg Glu Glu			
530	535	540	
agc ccc aag gtt cta ata act gca ttc taacgagggtt tccaaggcac			1800
Ser Pro Lys Val Leu Ile Thr Ala Phe			
545	550		
ttggcaaact gaaaagcaga tgtatacaat gagcaggggtg tgatagagca agcctgcaat			1860
cccagcgctc ttgggggtgga gacagaagat caggagttca aggtcatcct tggctacagc			1920
aggagtgtaa gaccagcctg tcttaccaca agcaaccctg tctcaacaga acaaatcaaa			1980
agcctttttct gctgaaaggg attaacagaa acaatgagca ccaaactgga cttgtggaga			2040
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<223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

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<223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

<400> 26  
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<210> 27  
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 <212> PRT  
 <213> Mus musculus

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Gly Phe Asn Gly Met Ser Ile Val Phe Leu Ala Gly Thr Pro Glu His  
 35 40 45

Arg Cys Leu Val Pro His Thr Val Asn Leu Ser Ser Ala Trp Arg Asn  
 50 55 60

His Ser Ile Pro Leu Glu Thr Lys Asp Gly Arg Gln Val Pro Gln Lys  
 65 70 75 80

Cys Arg Arg Tyr Arg Leu Ala Thr Ile Ala Asn Phe Ser Glu Leu Gly  
 85 90 95

Leu Glu Pro Gly Arg Asp Val Asp Leu Glu Gln Leu Glu Gln Glu Ser  
 100 105 110

Cys Leu Asp Gly Trp Glu Tyr Asp Lys Asp Val Phe Leu Ser Thr Ile  
 115 120 125

Val Thr Glu Trp Asp Leu Val Cys Lys Asp Asp Trp Lys Ala Pro Leu  
 130 135 140

Thr Thr Ser Leu Phe Phe Val Gly Val Leu Met Gly Ser Phe Ile Ser

145		150		155		160
Gly Gln Leu Ser Asp Arg Phe Gly Arg Lys Asn Val Leu Phe Leu Thr						
		165		170		175
Met Gly Met Gln Thr Gly Phe Ser Phe Leu Gln Val Phe Ser Val Asn						
		180		185		190
Phe Glu Met Phe Thr Val Leu Phe Val Leu Val Gly Met Gly Gln Ile						
		195		200		205
Ser Asn Tyr Val Ala Ala Phe Val Leu Gly Thr Glu Ile Leu Ser Lys						
		210		215		220
Ser Ile Arg Ile Ile Phe Ala Thr Leu Gly Val Cys Ile Phe Tyr Ala						
		225		230		240
Phe Gly Phe Met Val Leu Pro Leu Phe Ala Tyr Phe Ile Arg Asp Trp						
		245		250		255
Arg Met Leu Leu Leu Ala Leu Thr Val Pro Gly Val Leu Cys Gly Ala						
		260		265		270
Leu Trp Trp Phe Ile Pro Glu Ser Pro Arg Trp Leu Ile Ser Gln Gly						
		275		280		285
Arg Ile Lys Glu Ala Glu Val Ile Ile Arg Lys Ala Ala Lys Ile Asn						
		290		295		300
Gly Ile Val Ala Pro Ser Thr Ile Phe Asp Pro Ser Glu Leu Gln Asp						
		305		310		320
Leu Asn Ser Thr Lys Pro Gln Leu His His Ile Tyr Asp Leu Ile Arg						
		325		330		335
Thr Arg Asn Ile Arg Val Ile Thr Ile Met Ser Ile Ile Leu Trp Leu						
		340		345		350
Thr Ile Ser Val Gly Tyr Phe Gly Leu Ser Leu Asp Thr Pro Asn Leu						
		355		360		365
His Gly Asp Ile Tyr Val Asn Cys Phe Leu Leu Ala Ala Val Glu Val						
		370		375		380
Pro Ala Tyr Val Leu Ala Trp Leu Leu Leu Gln Tyr Leu Pro Arg Arg						
		385		390		400
Tyr Ser Ile Ser Ala Ala Leu Phe Leu Gly Gly Ser Val Leu Leu Phe						
		405		410		415
Met Gln Leu Val Pro Ser Glu Leu Phe Tyr Leu Ser Thr Ala Leu Val						
		420		425		430
Met Val Gly Lys Phe Gly Ile Thr Ser Ala Tyr Ser Met Val Tyr Val						
		435		440		445
Tyr Thr Ala Glu Leu Tyr Pro Thr Val Val Arg Asn Met Gly Val Gly						

450                      455                      460

Val Ser Ser Thr Ala Ser Arg Leu Gly Ser Ile Leu Ser Pro Tyr Phe  
465                      470                      475                      480

Val Tyr Leu Gly Ala Tyr Asp Arg Phe Leu Pro Tyr Ile Leu Met Gly  
                    485                      490                      495

Ser Leu Thr Ile Leu Thr Ala Ile Leu Thr Leu Phe Phe Pro Glu Ser  
                    500                      505                      510

Phe Gly Val Pro Leu Pro Asp Thr Ile Asp Gln Met Leu Arg Val Lys  
                    515                      520                      525

Gly Ile Lys Gln Trp Gln Ile Gln Ser Gln Thr Arg Met Gln Lys Asp  
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<210> 28  
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<222> (60)..(1730)

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atg cgg gac tac gac gag gtg acc gcc ttc cta ggc gag tgg ggg ccc 107  
Met Arg Asp Tyr Asp Glu Val Thr Ala Phe Leu Gly Glu Trp Gly Pro  
1                      5                      10                      15

ttc cag cgc ctc atc ttc ttc ctg ctc agc gcc agc atc atc ccc aat 155  
Phe Gln Arg Leu Ile Phe Phe Leu Leu Ser Ala Ser Ile Ile Pro Asn  
                    20                      25                      30

ggc ttc aat ggt atg tcc atc gtg ttc ctg gcg ggg acc ccg gag cac 203  
Gly Phe Asn Gly Met Ser Ile Val Phe Leu Ala Gly Thr Pro Glu His  
                    35                      40                      45

cgt tgc ctt gtg cct cac acc gtg aac ctg agc agc gcg tgg cgc aac 251  
Arg Cys Leu Val Pro His Thr Val Asn Leu Ser Ser Ala Trp Arg Asn  
                    50                      55                      60

cac agt atc ccg ttg gag acg aag gac gga cga cag gtg cct cag aaa 299  
His Ser Ile Pro Leu Glu Thr Lys Asp Gly Arg Gln Val Pro Gln Lys  
65                      70                      75                      80

tgc cgc cgc tac cga ctg gcc acc atc gcc aac ttc tct gag cta ggg 347  
Cys Arg Arg Tyr Arg Leu Ala Thr Ile Ala Asn Phe Ser Glu Leu Gly  
                    85                      90                      95

ctg gag ccg ggg cgg gac gtg gac ctg gag cag ctg gag cag gag agc 395

Leu	Glu	Pro	Gly	Arg	Asp	Val	Asp	Leu	Glu	Gln	Leu	Glu	Gln	Glu	Ser		
			100					105					110				
tgc	ctg	gat	ggc	tgg	gag	tac	gac	aag	gac	gtc	ttc	ctg	tcc	acc	atc	443	
Cys	Leu	Asp	Gly	Trp	Glu	Tyr	Asp	Lys	Asp	Val	Phe	Leu	Ser	Thr	Ile		
		115					120					125					
gtg	aca	gag	tgg	gac	ctg	gtg	tgt	aag	gat	gac	tgg	aaa	gcc	cca	ctc	491	
Val	Thr	Glu	Trp	Asp	Leu	Val	Cys	Lys	Asp	Asp	Trp	Lys	Ala	Pro	Leu		
	130					135					140						
acc	acc	tcc	ttg	ttt	ttc	gtg	ggg	gtg	ctg	atg	ggc	tcc	ttc	att	tca	539	
Thr	Thr	Ser	Leu	Phe	Phe	Val	Gly	Val	Leu	Met	Gly	Ser	Phe	Ile	Ser		
145					150				155						160		
gga	cag	ctc	tca	gac	agg	ttt	ggg	cgc	aag	aat	gtg	ctg	ttt	ttg	acc	587	
Gly	Gln	Leu	Ser	Asp	Arg	Phe	Gly	Arg	Lys	Asn	Val	Leu	Phe	Leu	Thr		
				165				170						175			
atg	ggc	atg	cag	act	ggc	ttc	agc	ttc	ctg	cag	gtc	ttc	tct	gtg	aac	635	
Met	Gly	Met	Gln	Thr	Gly	Phe	Ser	Phe	Leu	Gln	Val	Phe	Ser	Val	Asn		
			180					185					190				
ttc	gag	atg	ttt	aca	gtg	ctt	ttt	gtc	ctt	ggt	ggc	atg	ggg	cag	atc	683	
Phe	Glu	Met	Phe	Thr	Val	Leu	Phe	Val	Leu	Val	Gly	Met	Gly	Gln	Ile		
	195					200						205					
tcc	aac	tac	gtg	gca	gca	ttt	gtc	ctg	gga	aca	gaa	att	ctt	tcc	aag	731	
Ser	Asn	Tyr	Val	Ala	Ala	Phe	Val	Leu	Gly	Thr	Glu	Ile	Leu	Ser	Lys		
	210					215					220						
tca	att	cga	att	ata	ttc	gcc	acc	tta	gga	ggt	tgc	ata	ttt	tat	gcg	779	
Ser	Ile	Arg	Ile	Ile	Phe	Ala	Thr	Leu	Gly	Val	Cys	Ile	Phe	Tyr	Ala		
225					230				235					240			
ttt	ggc	ttc	atg	gtg	ctg	cca	ctg	ttt	gca	tac	ttc	atc	aga	gac	tgg	827	
Phe	Gly	Phe	Met	Val	Leu	Pro	Leu	Phe	Ala	Tyr	Phe	Ile	Arg	Asp	Trp		
				245				250					255				
agg	atg	ctg	ctg	ctg	gcg	ctc	act	gtg	cca	ggg	gtg	cta	tgt	ggg	gct	875	
Arg	Met	Leu	Leu	Leu	Ala	Leu	Thr	Val	Pro	Gly	Val	Leu	Cys	Gly	Ala		
			260					265					270				
ctc	tgg	tgg	ttc	atc	cct	gag	tcc	cca	cga	tgg	ctc	atc	tct	caa	ggc	923	
Leu	Trp	Trp	Phe	Ile	Pro	Glu	Ser	Pro	Arg	Trp	Leu	Ile	Ser	Gln	Gly		
		275					280					285					
cga	att	aaa	gag	gca	gag	gtg	atc	atc	cgc	aaa	gct	gcc	aaa	atc	aat	971	
Arg	Ile	Lys	Glu	Ala	Glu	Val	Ile	Ile	Arg	Lys	Ala	Ala	Lys	Ile	Asn		
	290					295					300						
ggg	att	ggt	gca	cct	tcc	act	atc	ttc	gat	cca	agt	gag	tta	caa	gac	1019	
Gly	Ile	Val	Ala	Pro	Ser	Thr	Ile	Phe	Asp	Pro	Ser	Glu	Leu	Gln	Asp		
305					310				315					320			
tta	aat	tct	acg	aag	cct	cag	ttg	cac	cac	att	tat	gat	ctg	atc	cga	1067	
Leu	Asn	Ser	Thr	Lys	Pro	Gln	Leu	His	His	Ile	Tyr	Asp	Leu	Ile	Arg		

325	330	335	
aca cgg aat atc agg gtc atc acc atc atg tct ata atc ctg tgg ctg Thr Arg Asn Ile Arg Val Ile Thr Ile Met Ser Ile Ile Leu Trp Leu 340 345 350			1115
acc ata tca gtg ggc tat ttt gga cta tct ctt gac act cct aac ttg Thr Ile Ser Val Gly Tyr Phe Gly Leu Ser Leu Asp Thr Pro Asn Leu 355 360 365			1163
cat ggg gac atc tat gtg aac tgc ttc cta ctg gcg gct gtt gaa gtc His Gly Asp Ile Tyr Val Asn Cys Phe Leu Leu Ala Ala Val Glu Val 370 375 380			1211
cca gcc tat gtg ctg gcc tgg ctg ttg ttg cag tac ttg ccc cgg cga Pro Ala Tyr Val Leu Ala Trp Leu Leu Leu Gln Tyr Leu Pro Arg Arg 385 390 395 400			1259
tat tct atc tcg gct gcc ctt ttc ctg ggt ggc agt gtc ctt ctc ttc Tyr Ser Ile Ser Ala Ala Leu Phe Leu Gly Gly Ser Val Leu Leu Phe 405 410 415			1307
atg cag ctg gtg cct tca gaa ttg ttt tac ttg tcc act gcc ctg gtg Met Gln Leu Val Pro Ser Glu Leu Phe Tyr Leu Ser Thr Ala Leu Val 420 425 430			1355
atg gtg ggg aag ttt gga atc acc tct gcc tac tcc atg gtc tat gtg Met Val Gly Lys Phe Gly Ile Thr Ser Ala Tyr Ser Met Val Tyr Val 435 440 445			1403
tac aca gct gag ctg tac ccc act gtg gtc aga aac atg ggt gtg ggg Tyr Thr Ala Glu Leu Tyr Pro Thr Val Val Arg Asn Met Gly Val Gly 450 455 460			1451
gtc agc tcc aca gca tcc cgc ctt ggc agc atc ctg tct ccc tac ttt Val Ser Ser Thr Ala Ser Arg Leu Gly Ser Ile Leu Ser Pro Tyr Phe 465 470 475 480			1499
gtt tac cta ggt gcc tat gat cgc ttc ctg cct tat att ctc atg gga Val Tyr Leu Gly Ala Tyr Asp Arg Phe Leu Pro Tyr Ile Leu Met Gly 485 490 495			1547
agt ctg acc atc ctg aca gct atc ctc acc ttg ttc ttc cct gag agc Ser Leu Thr Ile Leu Thr Ala Ile Leu Thr Leu Phe Phe Pro Glu Ser 500 505 510			1595
ttt ggt gtc cct ctc cca gat acc att gac cag atg cta agg gtc aaa Phe Gly Val Pro Leu Pro Asp Thr Ile Asp Gln Met Leu Arg Val Lys 515 520 525			1643
gga ata aaa cag tgg caa atc caa agc cag aca aga atg caa aaa gat Gly Ile Lys Gln Trp Gln Ile Gln Ser Gln Thr Arg Met Gln Lys Asp 530 535 540			1691
ggt gaa gaa agc cca aca gtc cta aag agc aca gcc ttc taacaccctg Gly Glu Glu Ser Pro Thr Val Leu Lys Ser Thr Ala Phe 545 550 555			1740

tccagaaggc aaaaaactga ttggaaacct tcatgttgtc agaaatgctc tccatgactg 1800  
 agggccttttc tgttctgtta accttggtgc taacatgctc atggattggg gcatctgtcc 1860  
 tggagagtca ccttctctta gggacacc 1888

<210> 29  
 <211> 44  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

<400> 29  
 ctaatacgac tcactatagg gctcgagcgg ccgcccgggc aggt 44

<210> 30  
 <211> 43  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

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<210> 31  
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 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

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<210> 32  
 <211> 11  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

<400> 32  
 accgccctcc g 11

<210> 33  
 <211> 14



<212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Exemplary motif

<221> VARIANT  
 <222> 1  
 <223> Xaa = Leu, Ile, Val, Met, Ser, Thr, Ala, or Gly

<221> VARIANT  
 <222> 2  
 <223> Xaa = Leu, Ile, Val, Met, Phe, Ser, Ala, or Gly

<221> VARIANT  
 <222> 3, 6, 11-13  
 <223> Xaa = any amino acid

<221> VARIANT  
 <222> 4  
 <223> Xaa = Leu, Ile, Val, Met, Ser, or Ala

<221> VARIANT  
 <222> 5  
 <223> Xaa = Asp, or Glu

<221> VARIANT  
 <222> 7  
 <223> Xaa = Leu, Ile, Val, Met, Phe, Tyr, Trp, or Ala

<221> VARIANT  
 <222> 10  
 <223> Xaa = Arg, or Lys

<221> VARIANT  
 <222> 14  
 <223> Xaa = Gly, Ser, Thr, or Ala

<400> 33  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Gly Arg Xaa Xaa Xaa Xaa Xaa  
 1 5 10